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PROVISIONAL SPECIFICATION.

**“Improved Means applicable for use in Relieving Tobacco Smoke
of its Noxious Elements.”**

I, GEORGE GATTON MELHUSH HARDINGHAM, of Clun House, Surrey Street, in the County of London, Civil Engineer and Chartered Patent Agent, do hereby declare the nature of this invention (a communication to me from abroad from Hermann Otto Wendt of Bremen, in the German Empire, Manufacturer,) to be as follows:—

This invention relates to means for rendering the poisonous constituents of tobacco-smoke innocuous, and it consists essentially in acting upon such smoke by means of compounds of metals of the iron group (iron, manganese, nickel and cobalt,) with mineral acids, preferably sulphuric and hydrochloric acids, or with organic acids, such as citric and tartaric acids, which have the effect of converting the basic constituents of the smoke, that is to say, nicotine, pyridines, picolines and the like, into salts; while, on the other hand, the sulphuretted hydrogen and hydrocyanic acid present in the smoke are decomposed and rendered innocuous by the metallic hydroxide resulting from the reaction of the metallic compound with the basic constituents of the smoke.

Very satisfactory results have been obtained by the use of ferrosulphate and ferric chloride. By means of the present invention, 79 to 84 *per cent.* of the nicotine present in the tobacco can be eliminated from the smoke, a result unattainable by any of the known means for improving the smoke of tobacco.

The invention, may be carried out in various ways. For instance, an aqueous solution of the selected compound of the iron group—as for example, ferric chloride—is prepared, a fibrous substance is impregnated therewith, and dried. A layer, ball or other suitable body, of such impregnated and dried fibre is placed at the bottom of the pipe, or enclosed within the pointed end portion of the cigar; so that, on smoking, the smoke is caused to filter through said impregnated fibrous body. The fibrous substance may consist of a cotton-wad, of blotting paper, tobacco, or other suitable vegetable or animal fibre, asbestos or the like. In the case of cigars, the pointed end of the internal bundle of leaves or ‘filling’ may, prior to being wrapped with the outer or covering leaf, be dipped into the said liquor, so as to be penetrated thereby. The filling having been withdrawn from the liquor, and thoroughly dried is then wrapped as usual. To facilitate the penetration of the liquor, the said portion of the filling may be provided with small holes or slits extending inwardly.

Dated this 21st day of July, 1903.

G. G. M. HARDINGHAM.

Means applicable for use in Relieving Tobacco Smoke of its Noxious Elements.

COMPLETE SPECIFICATION.

Improved Means applicable for use in Relieving Tobacco Smoke of its Noxious Elements.

I, GEORGE GATTON MELHUISH HARDINGHAM, of Clun House, Surrey Street, in the County of London, Civil Engineer and Chartered Patent Agent, do hereby declare the nature of this invention (a communication to me from abroad from Hermann Otto Wendt of Bremen, in the German Empire, Manufacturer,) and in what manner the same is to be performed, to be particularly described 5 and ascertained in and by the following statement:—

This invention relates to means for rendering the poisonous constituents of tobacco smoke innocuous.

As is well known, the smoke of tobacco contains, as poisonous constituents, nicotine in the chemically unaltered state, decomposition-products thereof, as 10 for instance pyridine, picoline and other similar basic compounds, ammonia, sulphuretted hydrogen and even hydrocyanic acid in larger or smaller traces.

In order to get rid of these poisonous constituents, it has been proposed to subject the smoke to the combined action of organic acids, such as tannic, tartaric and citric acids and of compounds of palladium and platinum. The use 15 of certain molybdates has also been proposed.

By these means a satisfactory solution of the problem cannot be obtained for the reason that the salts formed by the combination of said acids with the bases of the smoke are re-decomposed when the smoke becomes hotter; besides which the said platinum or palladium salts have not a sufficiently strong precipitating 20 action upon the poisonous bases to compensate this failure of their said companion reagents; the sulphuretted hydrogen, hydrocyanic acid and other constituents being moreover left unaltered. The molybdates also are only weak precipitants with regard to the bases in question.

Now it has been found that the poisonous basic constituents of tobacco smoke 25 can, in a very efficient manner, be bound into stable salts, and the sulphuretted hydrogen and hydrocyanic acid eliminated from the smoke by acting upon the latter with single or double salts formed by metals of the iron-group, that is to say, iron, manganese, nickel and cobalt, with suitable mineral acids, such as sulphuric and hydrochloric acids or with organic acids, preferably citric and 30 tartaric acids. By causing said compounds to react with tobacco-smoke, they are split up by the basic constituents of the smoke which combine with the sulphuric or other acid to form salts; and the metal, set free in the form of hydroxide, reacts with the sulphuretted hydrogen, decomposing the same and combining with the sulphur; and moreover, decomposes any hydrocyanic acid 35 present.

Very good results will in general be obtained by the sulphates of the metals of the iron group; for instance, ferrous sulphate, ferrous-ammonia sulphate, or ferric chloride or ferrous tartrate and the corresponding salts of the other metals 40 of said group.

Based upon the said new discovery, the present invention consists substantially in utilising the same for rendering the poisonous constituents of tobacco smoke innocuous, and may be carried out in various ways.

For instance, a solution of the selected compound of the iron group—as for example, ferric chloride in distilled water—is prepared, a fibrous substance is 45 impregnated therewith, and dried. A layer, ball or other suitable body, of such impregnated and dried fibre is placed at the bottom of the pipe, or enclosed within the pointed end portion of the cigar; so that, on smoking, the smoke is

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caused to filter through said impregnated fibrous body. The fibrous substance may consist of a cotton-wad, of blotting paper, of tobacco, or of other suitable vegetable or animal fibre, asbestos or the like. In the case of cigars, the pointed end of the internal bundle of leaves or 'filler' may be used as the said fibrous substance; and prior to being wrapped with the outer or covering leaf may be dipped into the said liquor, so as to be penetrated thereby. The filler, having been withdrawn from the liquor and thoroughly dried, is then wrapped as usual. To facilitate the penetration of the liquor, the said portion of the filler may be provided with small holes or slits extending inwardly; and some glycerine may be added to the solution to act as a binder for assuring the adherence of the salt to the tobacco after drying.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I claim:—

1. The herein described means for relieving tobacco smoke of its noxious elements consisting in a fibrous body impregnated with a salt or salts of a metal or metals of the iron group, and applied to act as a filter for the smoke, substantially as set forth.

2. The herein described method of applying a salt or salts of a metal or metals of the iron group to cigars, substantially as and for the purpose set forth; same consisting in impregnating the pointed end of the filler, prior to being wrapped, with a solution of said salt or salts, drying the filler so impregnated and applying the wrapping leaf.

Dated this 20th day of April 1904.

G. G. M. HARDINGHAM.

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